

## Test Report

No. : CE/2019/A0022

Date : 2019/10/08

Page : 1 of 11

NIPPON MICROMETAL CORPORATION

158-1, SAYAMAGAHARA IRUMA-CITY, SAITAMA 358-0032, JAPAN

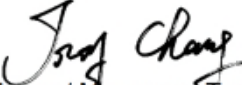
The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Description : NIPPON AU BONDING WIRE  
Style/Item No : T-SERIES(T1,T2,T3,T6)  
Sample Receiving Date : 2019/10/01  
Testing Period : 2019/10/01 to 2019/10/08

### Test Requested :

- (1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).
- (2) Please refer to next pages for the other item(s).

Test Result(s) : Please refer to following pages.

  
Troy Chang / Manager - Tech  
Signed for and behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory - Taipei



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# Test Report

No. : CE/2019/A0022

Date : 2019/10/08

Page : 2 of 11

NIPPON MICROMETAL CORPORATION

158-1, SAYAMAGAHARA IRUMA-CITY, SAITAMA 358-0032, JAPAN

## Test Result(s)

PART NAME No.1 : GOLDEN COLORED METAL WIRE

| Test Item(s)                   | Unit               | Method   | MDL  | Result |
|--------------------------------|--------------------|--|------|--------|
|                                |                    |  |      | No.1   |
| Cadmium (Cd)                   | mg/kg              | With reference to IEC 62321-5 (2013) and performed by ICP-OES.         | 2    | n.d.   |
| Lead (Pb)                      | mg/kg              |  | 2    | n.d.   |
| Mercury (Hg)                   | mg/kg              | With reference to IEC 62321-4:2013+AMD1:2017 and performed by ICP-OES. | 2    | n.d.   |
| Hexavalent Chromium Cr(VI)(#2) | µg/cm <sup>2</sup> | With reference to IEC 62321-7-1 (2015) and performed by UV-VIS.        | 0.10 | n.d.   |
| <b>Sum of PBBs</b>             | mg/kg              | With reference to IEC 62321-6 (2015) and performed by GC/MS.           | -    | n.d.   |
| Monobromobiphenyl              | mg/kg              |  | 5    | n.d.   |
| Dibromobiphenyl                | mg/kg              |  | 5    | n.d.   |
| Tribromobiphenyl               | mg/kg              |  | 5    | n.d.   |
| Tetrabromobiphenyl             | mg/kg              |  | 5    | n.d.   |
| Pentabromobiphenyl             | mg/kg              |  | 5    | n.d.   |
| Hexabromobiphenyl              | mg/kg              |  | 5    | n.d.   |
| Heptabromobiphenyl             | mg/kg              |  | 5    | n.d.   |
| Octabromobiphenyl              | mg/kg              |  | 5    | n.d.   |
| Nonabromobiphenyl              | mg/kg              |  | 5    | n.d.   |
| Decabromobiphenyl              | mg/kg              |  | 5    | n.d.   |
| <b>Sum of PBDEs</b>            | mg/kg              |  | -    | n.d.   |
| Monobromodiphenyl ether        | mg/kg              |  | 5    | n.d.   |
| Dibromodiphenyl ether          | mg/kg              |  | 5    | n.d.   |
| Tribromodiphenyl ether         | mg/kg              |  | 5    | n.d.   |
| Tetrabromodiphenyl ether       | mg/kg              |  | 5    | n.d.   |
| Pentabromodiphenyl ether       | mg/kg              |  | 5    | n.d.   |
| Hexabromodiphenyl ether        | mg/kg              |  | 5    | n.d.   |
| Heptabromodiphenyl ether       | mg/kg              |  | 5    | n.d.   |
| Octabromodiphenyl ether        | mg/kg              |  | 5    | n.d.   |
| Nonabromodiphenyl ether        | mg/kg              | 5  | n.d. |        |
| Decabromodiphenyl ether        | mg/kg              | 5  | n.d. |        |

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# Test Report

No. : CE/2019/A0022

Date : 2019/10/08

Page : 3 of 11

NIPPON MICROMETAL CORPORATION

158-1, SAYAMAGAHARA IRUMA-CITY, SAITAMA 358-0032, JAPAN

| Test Item(s)  | Unit  | Method   | MDL | Result |
|---|-------|--|-----|--------|
|   |       |  |     | No.1   |
| DBP (Dibutyl phthalate) (CAS No.: 84-74-2)                | mg/kg | With reference to IEC 62321-8 (2017).<br>Analysis was performed by GC/MS.    | 50  | n.d.   |
| BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)           | mg/kg |  | 50  | n.d.   |
| DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)   | mg/kg |  | 50  | n.d.   |
| DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)           | mg/kg |  | 50  | n.d.   |
| <b>Halogen</b>  |       |  |     |        |
| Halogen-Fluorine (F) (CAS No.: 14762-94-8)                | mg/kg | With reference to BS EN 14582 (2016).<br>Analysis was performed by IC.       | 50  | n.d.   |
| Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)               | mg/kg |  | 50  | n.d.   |
| Halogen-Bromine (Br) (CAS No.: 10097-32-2)                | mg/kg |  | 50  | n.d.   |
| Halogen-Iodine (I) (CAS No.: 14362-44-8)                  | mg/kg |  | 50  | n.d.   |
| Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide) | mg/kg | With reference to US EPA 3550C (2007).<br>Analysis was performed by LC/MS.   | 10  | n.d.   |
| PFOA (CAS No.: 335-67-1)                                  | mg/kg | With reference to US EPA 3550C (2007).<br>Analysis was performed by LC/MS.   | 10  | n.d.   |
| Antimony (Sb)   | mg/kg | With reference to US EPA 3050B (1996).<br>Analysis was performed by ICP-OES. | 2   | n.d.   |
| Arsenic (As)  | mg/kg | With reference to US EPA 3052 (1996).<br>Analysis was performed by ICP-OES.  | 2   | n.d.   |

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# Test Report

No. : CE/2019/A0022

Date : 2019/10/08

Page : 4 of 11

NIPPON MICROMETAL CORPORATION

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## Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected = less than MDL
4. " - " = Not Regulated
5. (#2) =
  - a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13  $\mu\text{g}/\text{cm}^2$ .  
The sample coating is considered to contain Cr(VI)
  - b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10  $\mu\text{g}/\text{cm}^2$ ).  
The coating is considered a non-Cr(VI) based coating
  - c. The result between 0.10  $\mu\text{g}/\text{cm}^2$  and 0.13  $\mu\text{g}/\text{cm}^2$  is considered to be inconclusive - unavoidable coating variations may influence the determination.

## PFOS Reference Information : POPs - (EU) 2019/1021

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1 $\mu\text{g}/\text{m}^2$ .

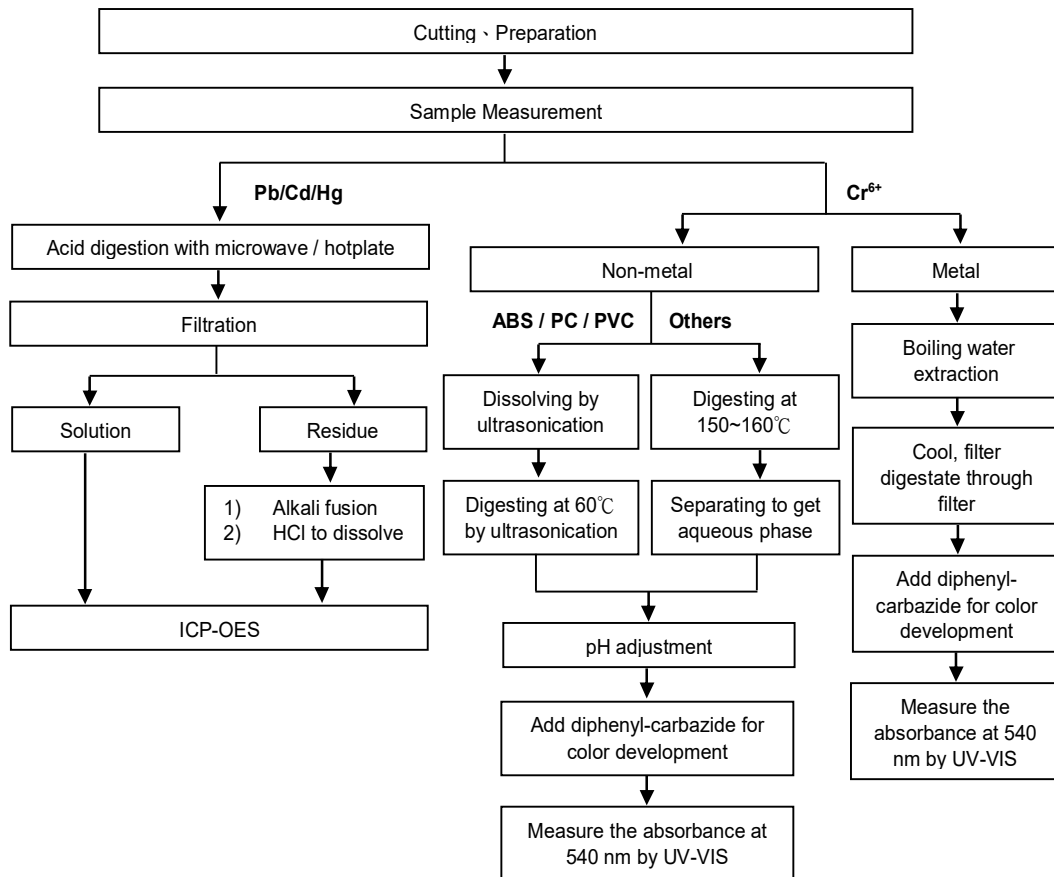
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## Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)

- Technician : Rita Chen
- Supervisor: Troy Chang

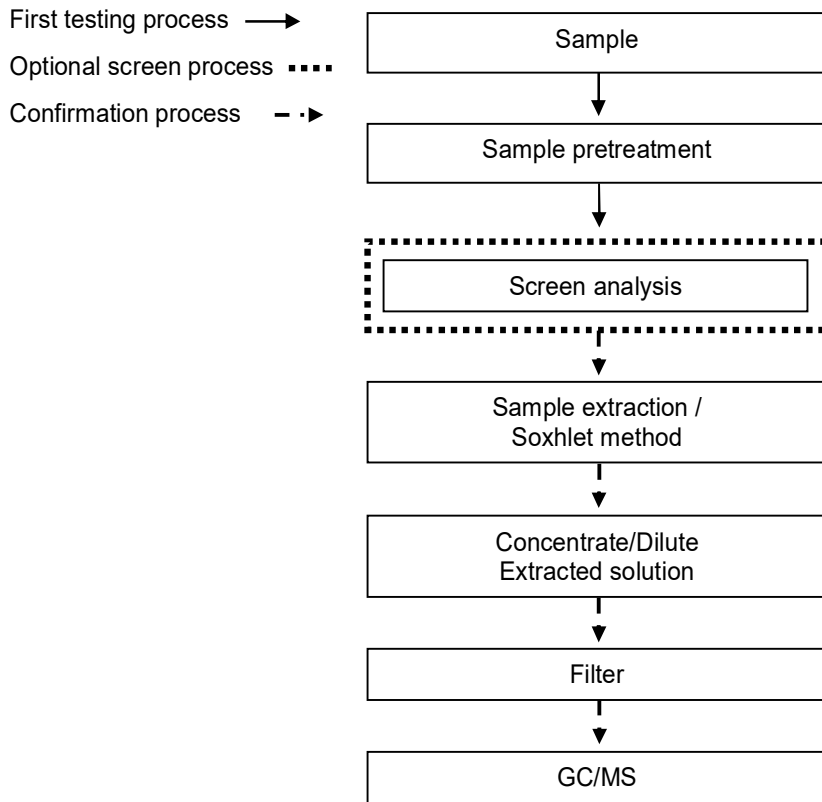


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### Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang



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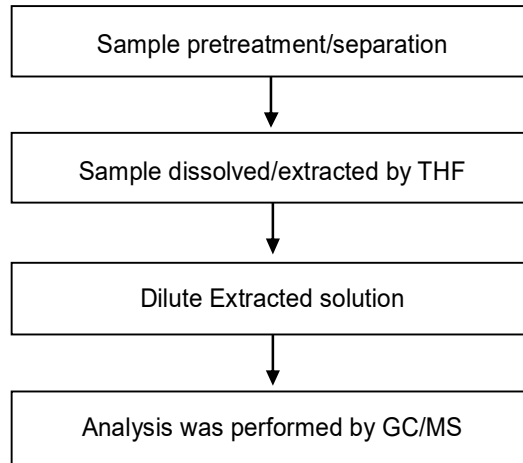
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### Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

**【Test method: IEC 62321-8】**



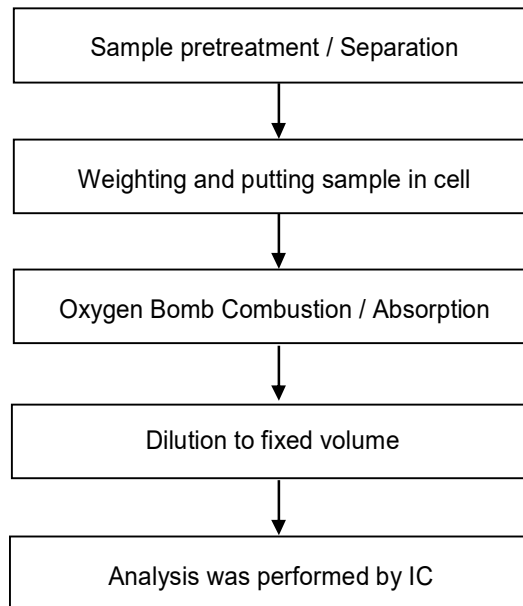
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### Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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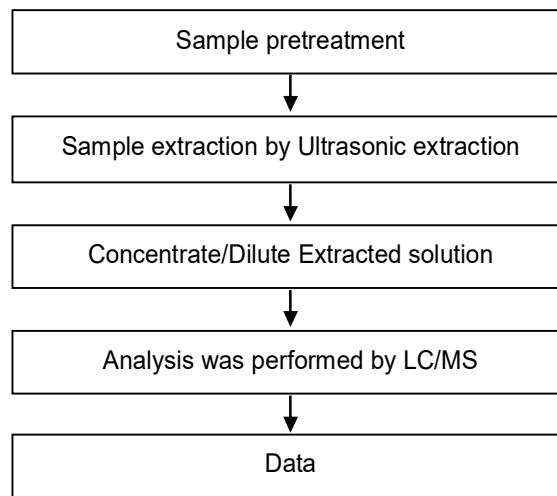


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### Analytical flow chart - PFOA/PFOS

- Technician: Yaling Tu
- Supervisor: Troy Chang



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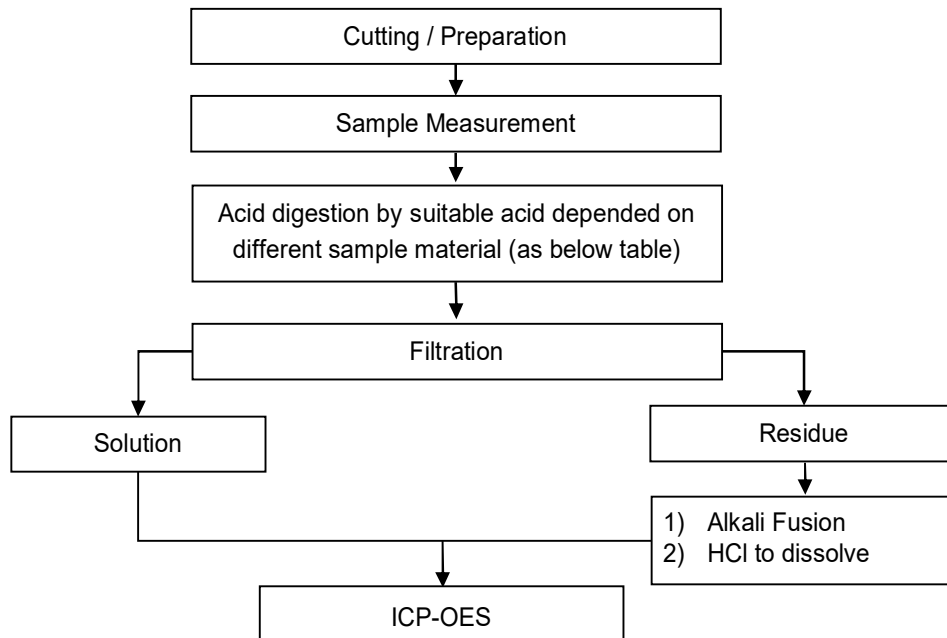
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These samples were dissolved totally by pre-conditioning method according to below flow chart.

- Technician: Rita Chen
- Supervisor: Troy Chang

### Flow Chart of digestion for the elements analysis performed by ICP-OES



|                                    |   |
|------------------------------------|---|
| Steel, copper, aluminum, solder    | Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>                   |
| Glass                              | HNO <sub>3</sub> /HF  |
| Gold, platinum, palladium, ceramic | Aqua regia  |
| Silver                             | HNO <sub>3</sub>  |
| Plastic                            | H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCl |
| Others                             | Added appropriate reagent to total digestion  |

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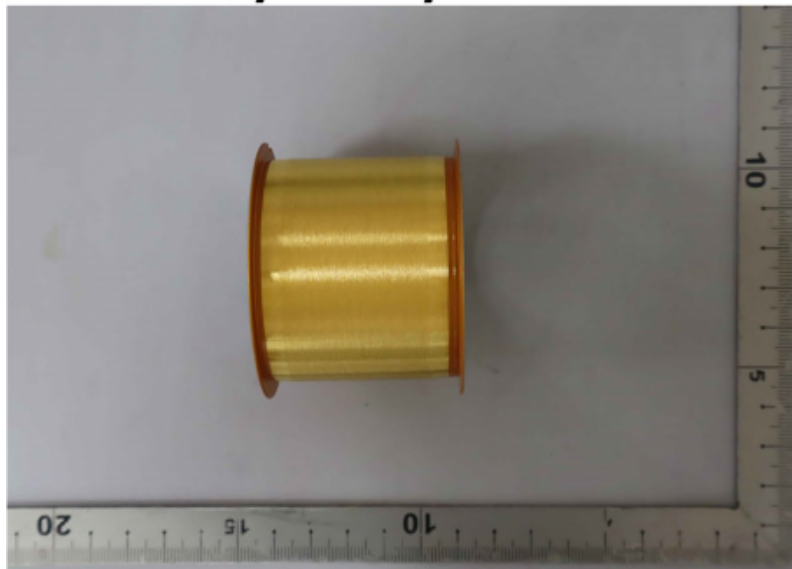
Page : 11 of 11

NIPPON MICROMETAL CORPORATION

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\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

### CE/2019/A0022



\*\* End of Report \*\*